

# Andrew Luthen, ME, EIT

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## SUMMARY

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- Practicing Mechanical Engineer with a background in design and analysis, and 3+ years of professional experience.
- Interested in research and development. Enjoy topics in machine design, simulation, programming, and economics.
- Excellent teamwork and communication skills. Experience working at a lab, an office, a manufacturing plant, and remotely.
- 2D and 3D design experience using SolidWorks, Inventor, NX, Creo, DraftSight with knowledge in GD&T and ANSI standards.
- Simulation experience using COMSOL, Ansys (CFD), and finite element analysis in multiple projects.
- Manufacturing skills including machining and fabrication, CNC, 3D printing, paint processes, design for manufacturability.
- Advanced computer skills applicable for engineering design and project management. Knowledge in MATLAB, Simulink, LabVIEW, Mathcad, PSpice, Science Workshop, Visual Studio, C++, Java, HTML, Python, Swift, Microsoft Office 365, Autodesk, Project Lifecycle Management (Teamcenter), Jira, FMEA, and Excel macros & functions.
- Experience with electronics, hydraulics, pneumatics, engines, machinery, dynamometers, data acquisition systems, oscilloscope & function generators, wind tunnels, Raspberry Pi, rotameters, rheometers, differential scanning calorimeters, thermocouples, pressure transducers, pitot tubes, stress and strain gauges, hardness testers, tensile testers, impact testers, microscopes (traditional, digital, SEM, AFM), lasers, diffraction gratings, motion and light sensors, optics.

## EDUCATION

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**The University of Texas Rio Grande Valley, Edinburg, Texas**  
**Bachelor of Science in Mechanical Engineering, December 2017**  
**Summa Cum Laude, GPA: 3.97 (out of 4.0)**

## WORK EXPERIENCE

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**Altec Industries –**

***Applications Engineer II***

***Applications Engineer***

**March 2021-Present**

**January 2019-March 2021**

- Design engineer and project manager for custom aerial devices used all over the world. Work with a cross functional team to develop heavy duty vehicles to meet customer requirements for the electrical infrastructure sector, tree and sign care industries, and government contracts. Work on the custom line team as a structural specialist responsible for complete 3D vehicle models.
- Design structural components to improve the capability of customers to do their job safer and easier. Many components are new designs that are fabricated from steel based off tooling standards. There is also a catalogue of parts to work with.
- Assist in the creation of custom electrical and hydraulic prints, and configure chassis programming logic using Diamond Logic and SmartPlex. Work on pump size calculations, load calculations, and troubleshoot functionality issues that arise.
- Generate a bill of materials for each spec and manufacturing documentation for the production floor to build the vehicle (vehicle drawings, part/weldment prints, electrical and hydraulic schematics). ANSI and DOT documentation are included for each build such as weight studies, FEA validation, and component design info. The complex nature of the products involves the structural, electrical, hydraulic, and manufacturing side of engineering, and I support the production of builds through each stage of the manufacturing process. I work closely with customers building business relationships and know a lot about selling a product. Worked for around 50 customers on over 250 jobs as an engineering lead.
- Participate in company trainings surrounding teamwork, the Toyota Production System, technical topics, and completed certifications in SolidWorks and hydraulics. Participate in and lead several continuous improvement events focusing on quality, cost reduction, process improvement, and technological advancement. Each event includes a formal presentation.

**University of Texas Rio Grande Valley – *Student Researcher***

**August 2016-January 2018**

- Worked closely alongside professors at the Multi-Phase Transport Lab to conduct and present research, assist in the lab, computer design models, and develop analysis reports. This included optimizing design parameters, manufacturing including milling and CNC machining, assembling and testing prototype models, and working hands on with lab equipment and software to acquire experimental data. Held weekly meetings to present findings to the team and public.
- Projects and research included wave energy harvesting, GHG emission audits, 3D bioprinting of human tissue, desalination techniques for thermal energy storage and water purification using nozzles and graphene membranes, refrigeration technologies, solar powered devices, water treatment systems, heat transfer and fluid dynamic simulations.

**University of Texas at Brownsville – *Tutor / Teacher Assistant***

**2012-2014**

- Tutored subjects including college algebra, pre-calculus, calculus, diff. eq., statistics, contemporary math, physics, statics, and dynamics. Tutored students one on one, as well as holding weekly class sessions to instruct and provide feedback to about 30 students as part of a teacher's assistant position in the math department.

## EXPERIENCE

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### **Kaizen Events**

**Altec Industries 2019-2022**

Identify and address several design improvements on multiple projects. For example, I identified a manufacturing defect present on a newly designed step latch. This prevented us from shipping over 30 trucks that would have caused excessive warranty claims and safety issues. Also, I worked with a team to determine body design and layout updates that improved quality and manufacturability. The changes implemented reduced throughput by 30% by skipping extra paint processes and there were 80% less warranty claims by the customer compared to previous models.

### **Design and Validation Using FEA and Prototyping**

**Altec Industries 2019-2022**

Regularly design custom tow packages that include brackets and mounts for extra accessories, and validate the safety factor using SolidWorks Simulationxpress. For one highly custom design I assisted in setting up a test stand to pull test a prototype of the model.

### **Standardized Design Review Process**

**Altec Industries 2021**

Co-led an event that revamped our engineering design review process. Created a new standard regarding our preliminary and final reviews. This included the creation of templates that efficiently captured the issues brought up during a review, as well as a Jira dashboard where the reviews are logged and processed with clear indicators of their status.

### **Standard Model Creation**

**Altec Industries 2019**

Created the SolidWorks model for a standard spot light that had been updated by the supplier. I used the supplied 2D drawings and took measurements of the light to create an exact 3D model using advanced surface modeling tools. Also, I created the standard hydraulic capstan bracket that is used at each manufacturing plant across Altec.

### **Senior Design Project: Thermoacoustic Dehumidifier**

**UTRGV 2017**

Developed a dehumidifier designed for atmospheric water generation, equipped with heat exchangers to exploit the cycle. Involved designing the device using Autodesk Inventor and Fusion 360 and manufacturing the device using 3D printing, machining, forming, and joining processes. Set up a thermocouple VI using LabVIEW to analyze the refrigeration cycle. Studied and optimized COP and condensation drainage using the data collected, an Excel and MATLAB math model of the device, as well as CFD simulations using Ansys Fluent. Successfully demonstrated a thermal gradient and collected condensed water from humid air with the constructed prototype. Shared details with faculty and peers in several PowerPoint presentations and a detailed technical report. Presented findings at ASME IMECE conference in Tampa, FL 2017.

### **Microfluidics Research Project**

**UTRGV 2017**

Analyzed the motion of red blood cells using the Navier-Stokes, Elasticity, and Bernoulli equations. The info was used to determine effects of clogged, rigid arteries on heart graft failure. Interpreted findings using FEA on modelled blood cell in Creo.

### **Electro-mechanical Calibration Project**

**UTRGV 2016**

Calibrated instruments at our laboratory including a pressure transducer used in a wave tunnel, LVDT used to measure vibrations, Wheatstone bridge strain gauge used to measure beam deflection, and a load cell used in a hydraulic lift. These calibrations involved creating LabVIEW VIs that converted the output voltage from the sensors into a readable format.

### **GoPro Charging Handle Design Project**

**UTB 2015**

Designed a waterproof battery-powered charging accessory for a GoPro camera. Designed in Autodesk Inventor and 3D printed the shell. Wired the battery inside the handle to the camera, sealed it, and tested it. Rechargeable via USB.

## SKILLS

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### **Programming-**

- Automated Chicken Coop- Designed a drop-down door that would automatically open during the day and allow chickens to access a larger portion of their coop. It was operated using a pulley attached to a motor.
- Thermal Backup Camera- Programmed a Raspberry Pi to sound an alarm if someone is detected by a thermal camera.
- Lego Motors- Built fully functional Lego motors including V6 and V8 models, and used a Raspberry Pi to control a servo motor's rpm and create graphs to measure max rpm before failure.

### **Computer and Electronics Technician**

### **Small Engine Mechanic, HVAC, Water Heater, and Refrigeration Repair**

## HONORS

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Certified Hydraulic Mechanic – Fluid Power Society (2019)

CSWA – Certified SolidWorks Associate (2019)

EIT – Engineer in Training (2018)

Scholastic Excellence Award (2015)

CRLA Tutor Program/ Level 2 Advanced Tutor (2014)

UIL Math Champion/ Gold Medal (2009)